FIG.1

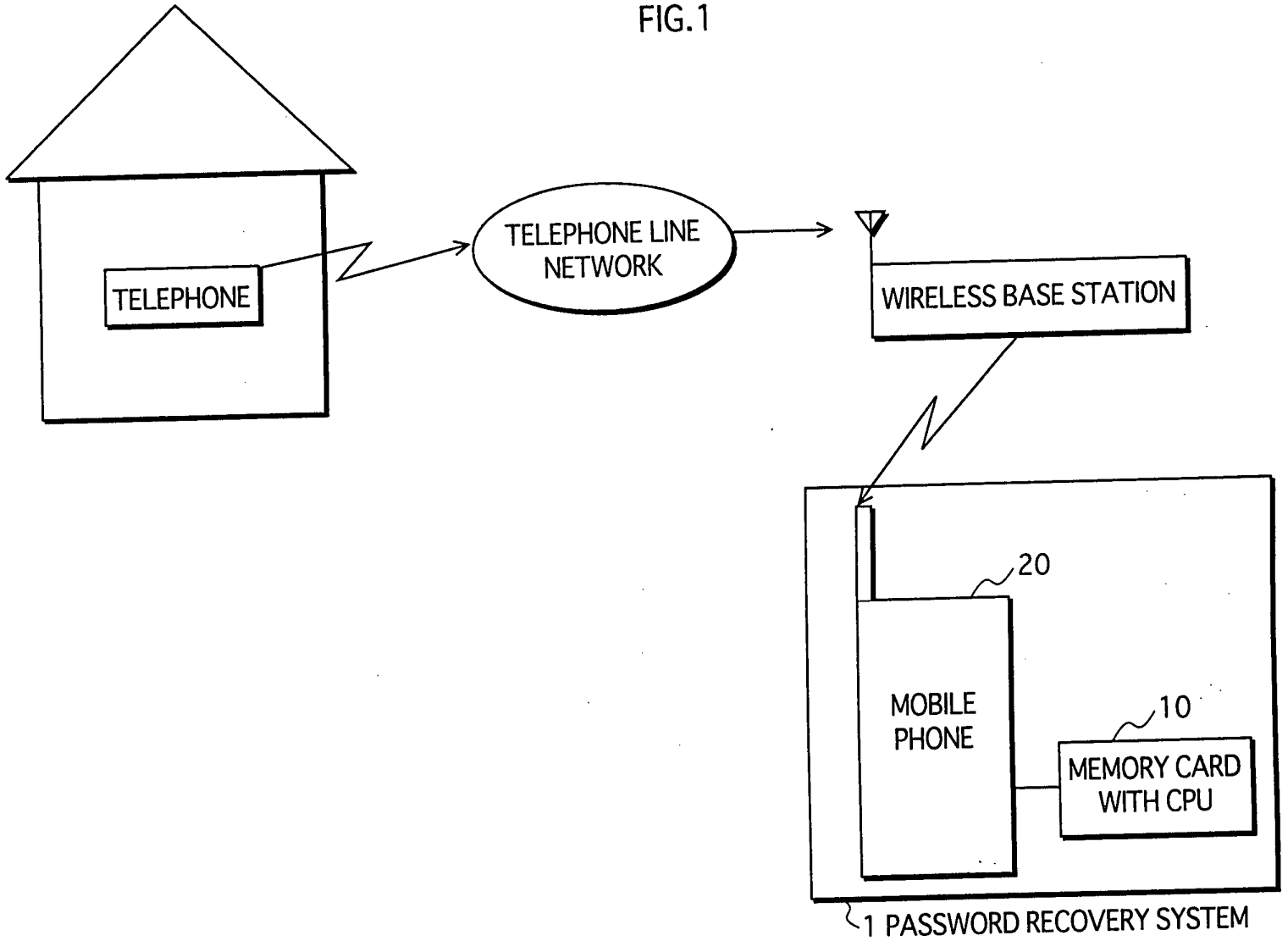

TELEPHONE
TELEPHONE LINE NETWORK
WIRELESS BASE STATION
20
MOBILE PHONE
10
MEMORY CARD WITH CPU
1 PASSWORD RECOVERY SYSTEM

FIG.2

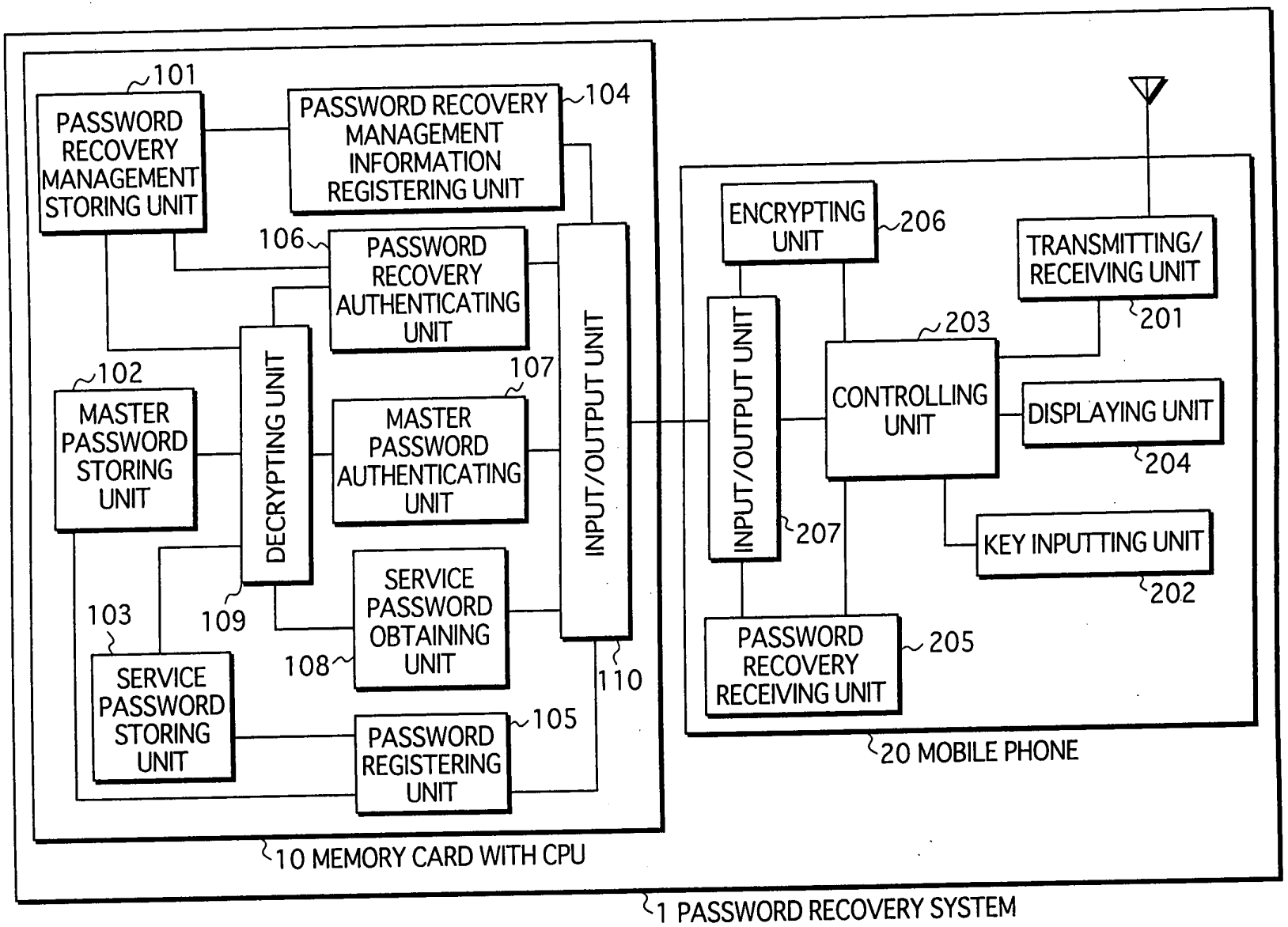

101
PASSWORD RECOVERY MANAGEMENT STORING UNIT
PASSWORD RECOVERY MANAGEMENT INFORMATION REGISTERING UNIT
104
106
PASSWORD RECOVERY AUTHENTICATING UNIT
102
MASTER PASSWORD STORING UNIT
DECRYPTING UNIT
107
MASTER PASSWORD AUTHENTICATING UNIT
INPUT/OUTPUT UNIT
103
109
SERVICE PASSWORD OBTAINING UNIT
108
SERVICE PASSWORD STORING UNIT
110
PASSWORD REGISTERING UNIT
105
10 MEMORY CARD WITH CPU
ENCRYPTING UNIT
206
TRANSMITTING/ RECEIVING UNIT
201
203
INPUT/OUTPUT UNIT
CONTROLLING UNIT
DISPLAYING UNIT
204
207
KEY INPUTTING UNIT
202
PASSWORD RECOVERY RECEIVING UNIT
205
20 MOBILE PHONE
1 PASSWORD RECOVERY SYSTEM

FIG.3

300 SERVICE PASSWORD REGISTRATION TABLE

NAMES OF SERVICES	SERVICE PASSWORDS
SERVICE A	ENCRYPTED PASSWORD A
SERVICE B	ENCRYPTED PASSWORD B
⋮	⋮

FIG.4

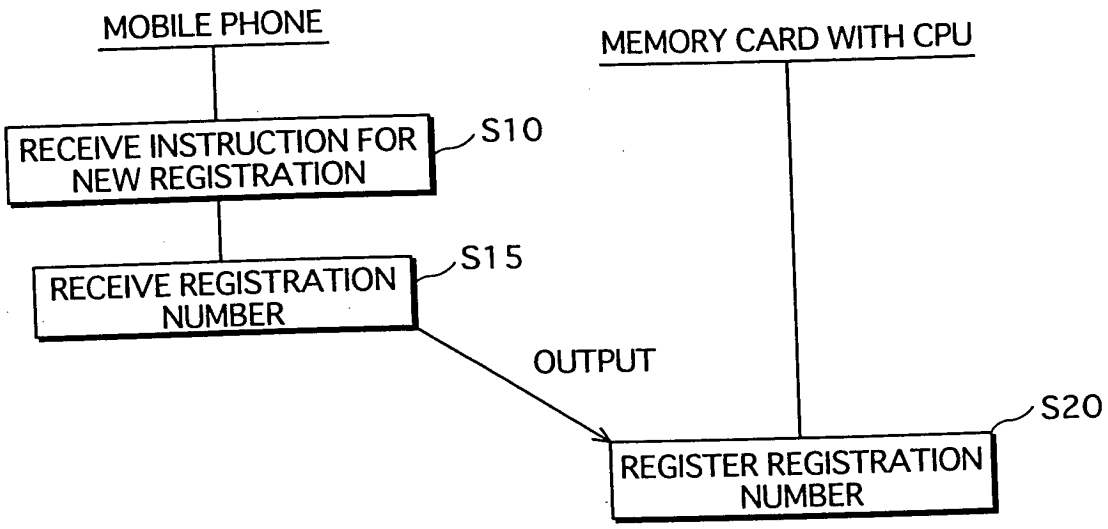

MOBILE PHONE
MEMORY CARD WITH CPU
RECEIVE INSTRUCTION FOR NEW REGISTRATION
S10
RECEIVE REGISTRATION NUMBER
S15
OUTPUT
S20
REGISTER REGISTRATION NUMBER

FIG.5

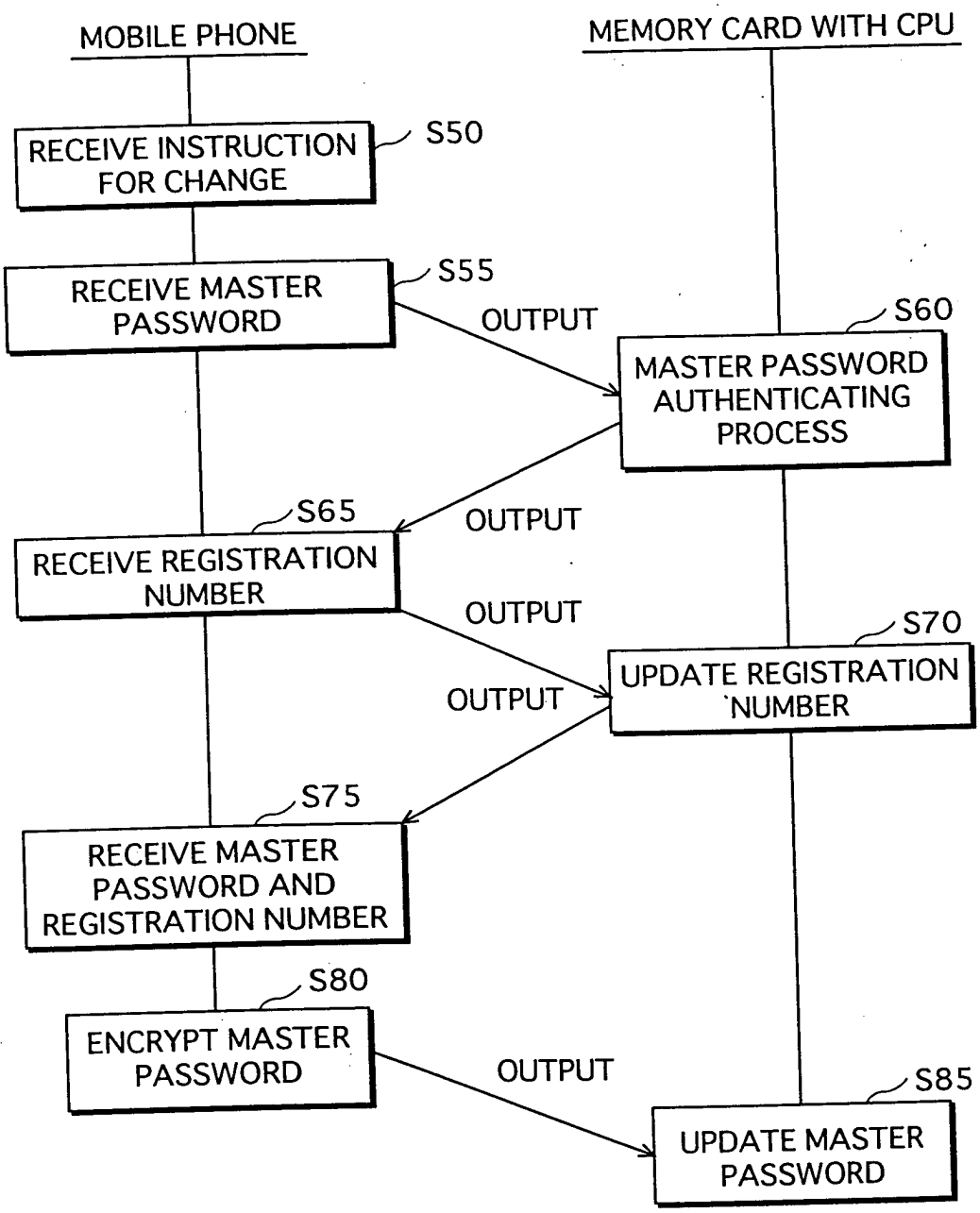

MOBILE PHONE
MEMORY CARD WITH CPU
RECEIVE INSTRUCTION FOR CHANGE
S50
RECEIVE MASTER PASSWORD
S55
OUTPUT
MASTER PASSWORD AUTHENTICATING PROCESS
S60
OUTPUT
RECEIVE REGISTRATION NUMBER
S65
OUTPUT
UPDATE REGISTRATION NUMBER
S70
OUTPUT
RECEIVE MASTER PASSWORD AND REGISTRATION NUMBER
S75
ENCRYPT MASTER PASSWORD
S80
OUTPUT
UPDATE MASTER PASSWORD
S85

FIG.6

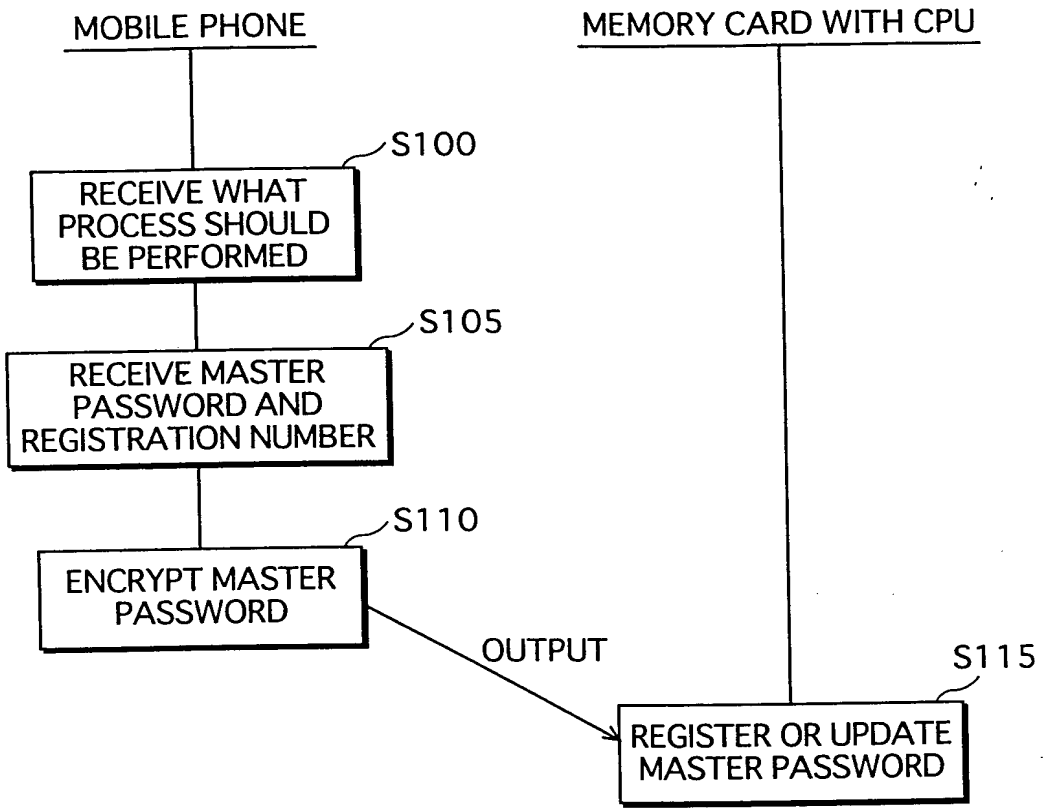

MOBILE PHONE
MEMORY CARD WITH CPU
S100
RECEIVE WHAT PROCESS SHOULD BE PERFORMED
S105
RECEIVE MASTER PASSWORD AND REGISTRATION NUMBER
S110
ENCRYPT MASTER PASSWORD
OUTPUT
S115
REGISTER OR UPDATE MASTER PASSWORD

FIG.7

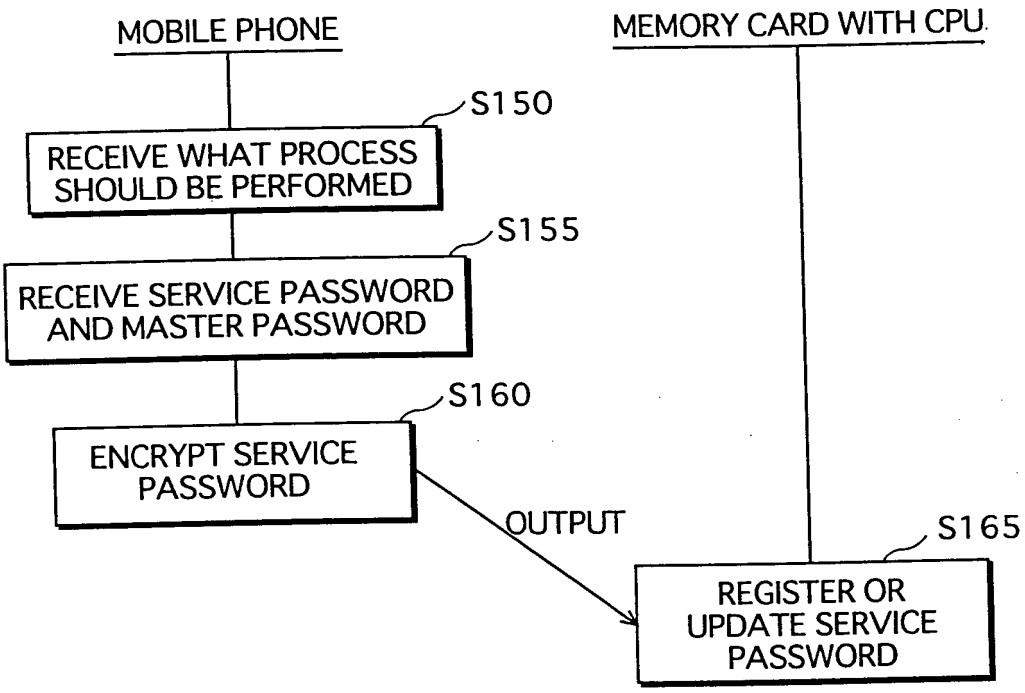

MOBILE PHONE
MEMORY CARD WITH CPU
S150
RECEIVE WHAT PROCESS SHOULD BE PERFORMED
S155
RECEIVE SERVICE PASSWORD AND MASTER PASSWORD
S160
ENCRYPT SERVICE PASSWORD
OUTPUT
S165
REGISTER OR UPDATE SERVICE PASSWORD

FIG.8

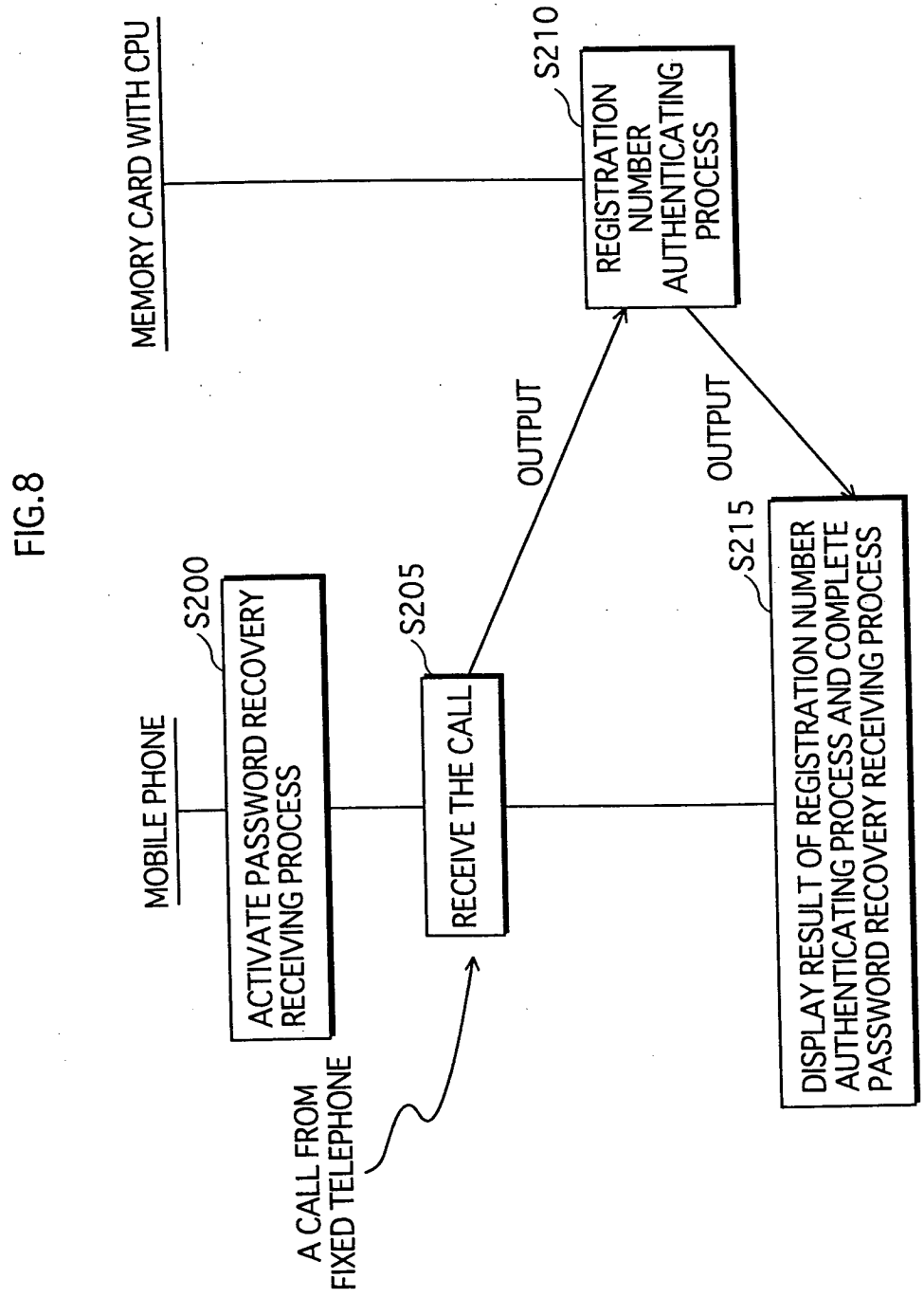

MEMORY CARD WITH CPU
S210
REGISTRATION NUMBER AUTHENTICATING PROCESS
OUTPUT
OUTPUT
MOBILE PHONE
S200
ACTIVATE PASSWORD RECOVERY RECEIVING PROCESS
S205
RECEIVE THE CALL
S215
DISPLAY RESULT OF REGISTRATION NUMBER AUTHENTICATING PROCESS AND COMPLETE PASSWORD RECOVERY RECEIVING PROCESS
A CALL FROM FIXED TELEPHONE

FIG.9

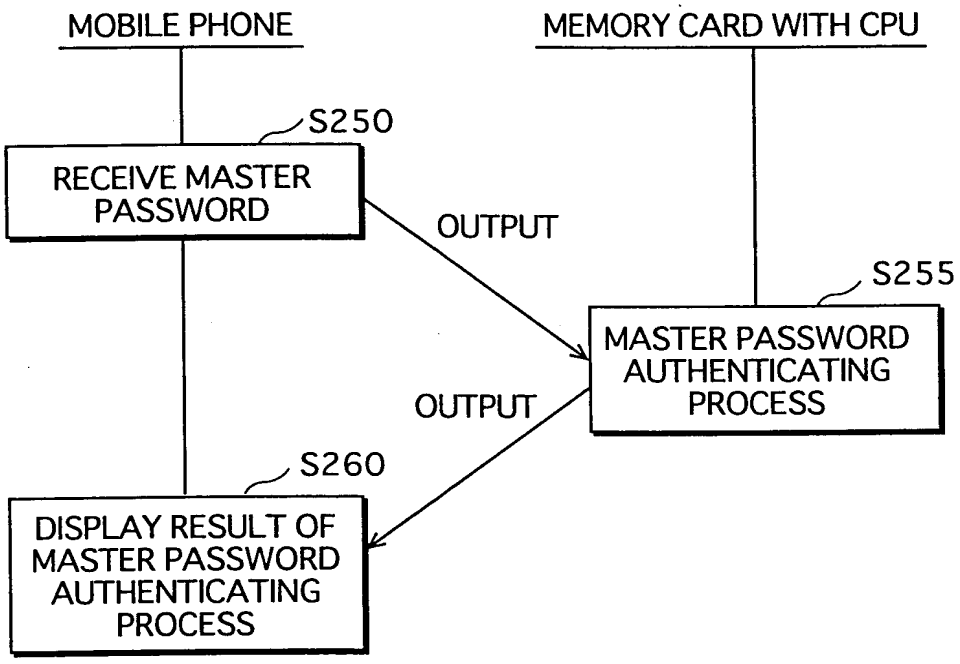

MOBILE PHONE
MEMORY CARD WITH CPU
S250
RECEIVE MASTER PASSWORD
OUTPUT
S255
MASTER PASSWORD AUTHENTICATING PROCESS
OUTPUT
S260
DISPLAY RESULT OF MASTER PASSWORD AUTHENTICATING PROCESS

FIG.10

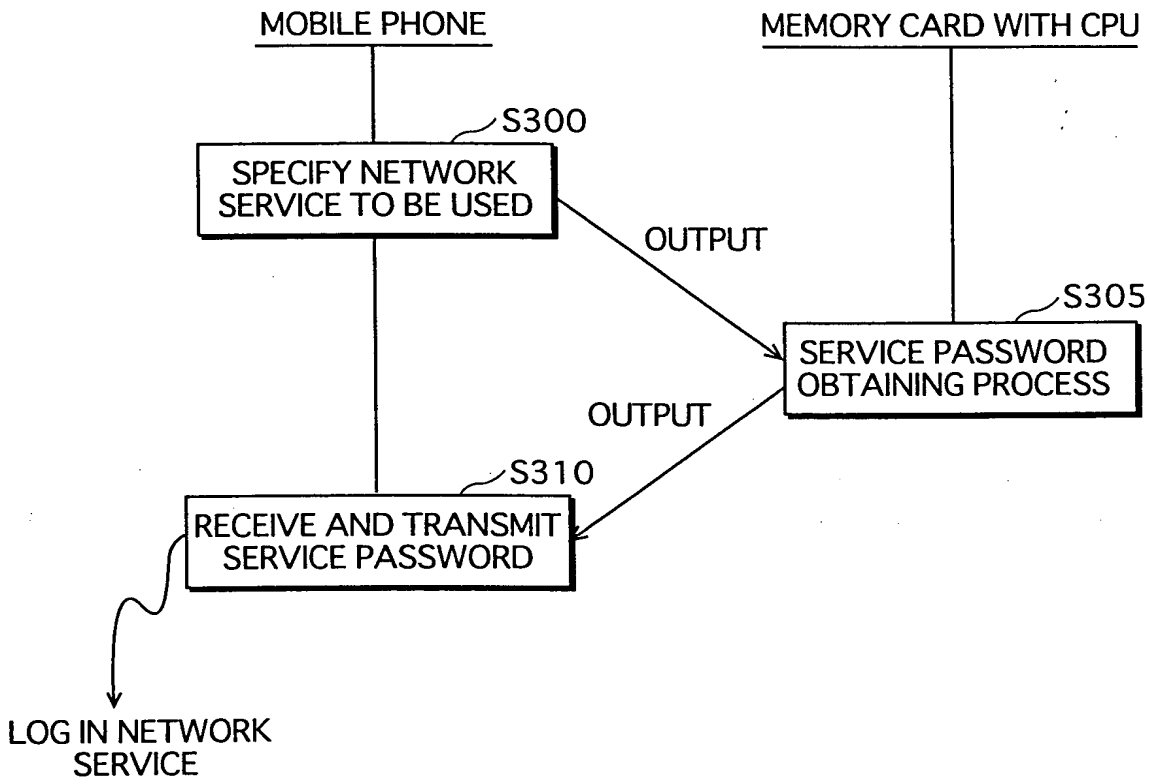

MOBILE PHONE
MEMORY CARD WITH CPU
S300
SPECIFY NETWORK SERVICE TO BE USED
OUTPUT
S305
SERVICE PASSWORD OBTAINING PROCESS
OUTPUT
S310
RECEIVE AND TRANSMIT SERVICE PASSWORD
LOG IN NETWORK SERVICE

FIG.11

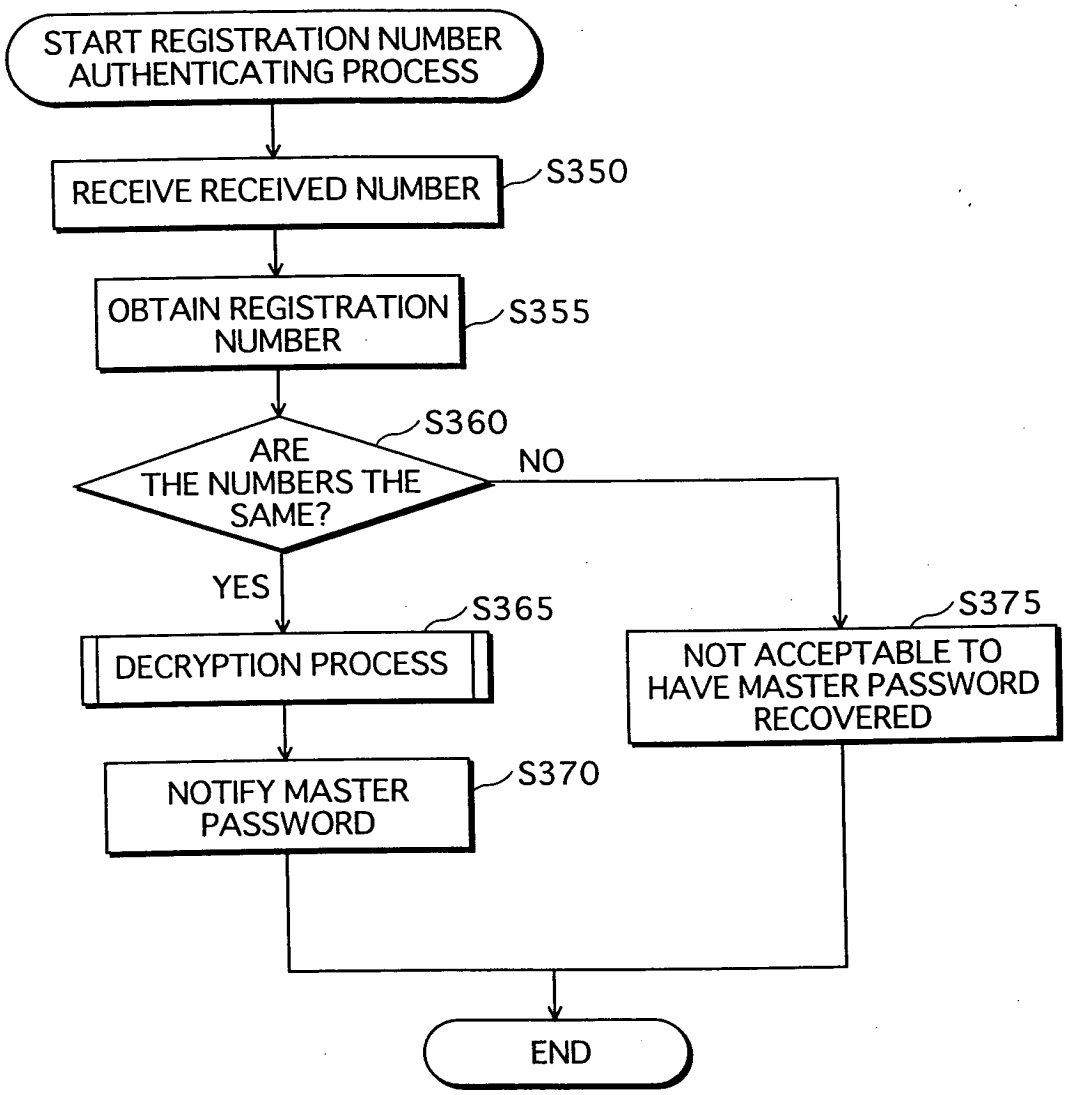

START REGISTRATION NUMBER AUTHENTICATING PROCESS
RECEIVE RECEIVED NUMBER
S350
OBTAIN REGISTRATION NUMBER
S355
S360
ARE THE NUMBERS THE SAME?
NO
YES
S365
DECRYPTION PROCESS
S375
NOT ACCEPTABLE TO HAVE MASTER PASSWORD RECOVERED
NOTIFY MASTER PASSWORD
S370
END

FIG.12

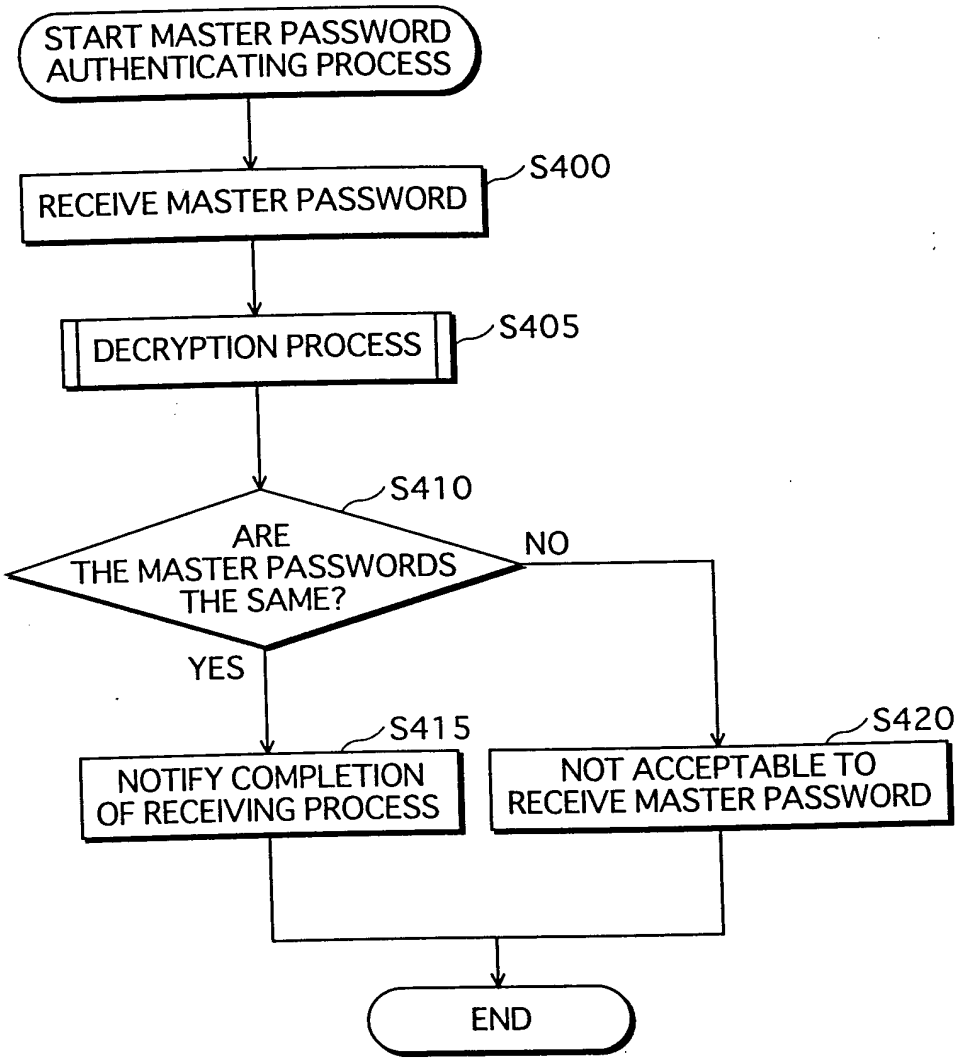

START MASTER PASSWORD AUTHENTICATING PROCESS
RECEIVE MASTER PASSWORD
S400
DECRYPTION PROCESS
S405
S410
ARE THE MASTER PASSWORDS THE SAME?
NO
YES
S415
NOTIFY COMPLETION OF RECEIVING PROCESS
S420
NOT ACCEPTABLE TO RECEIVE MASTER PASSWORD
END

FIG.13

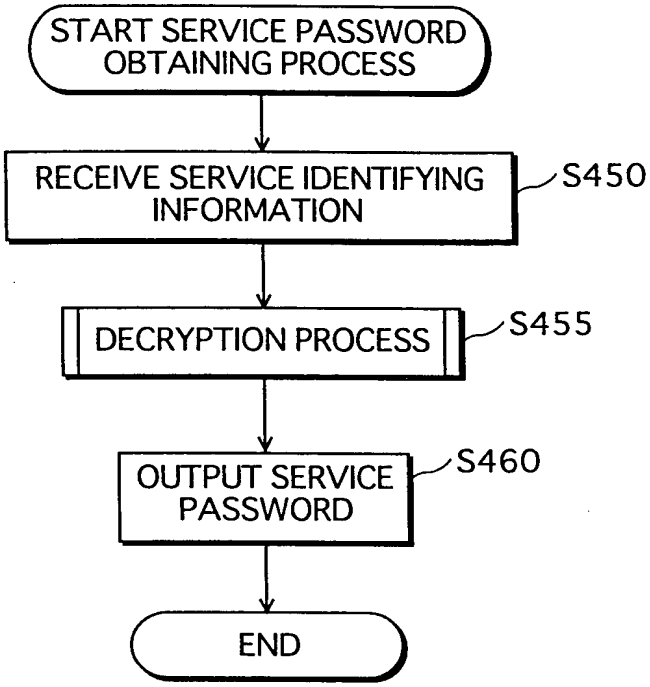

START SERVICE PASSWORD OBTAINING PROCESS
RECEIVE SERVICE IDENTIFYING INFORMATION
S450
DECRYPTION PROCESS
S455
OUTPUT SERVICE PASSWORD
S460
END

FIG.14

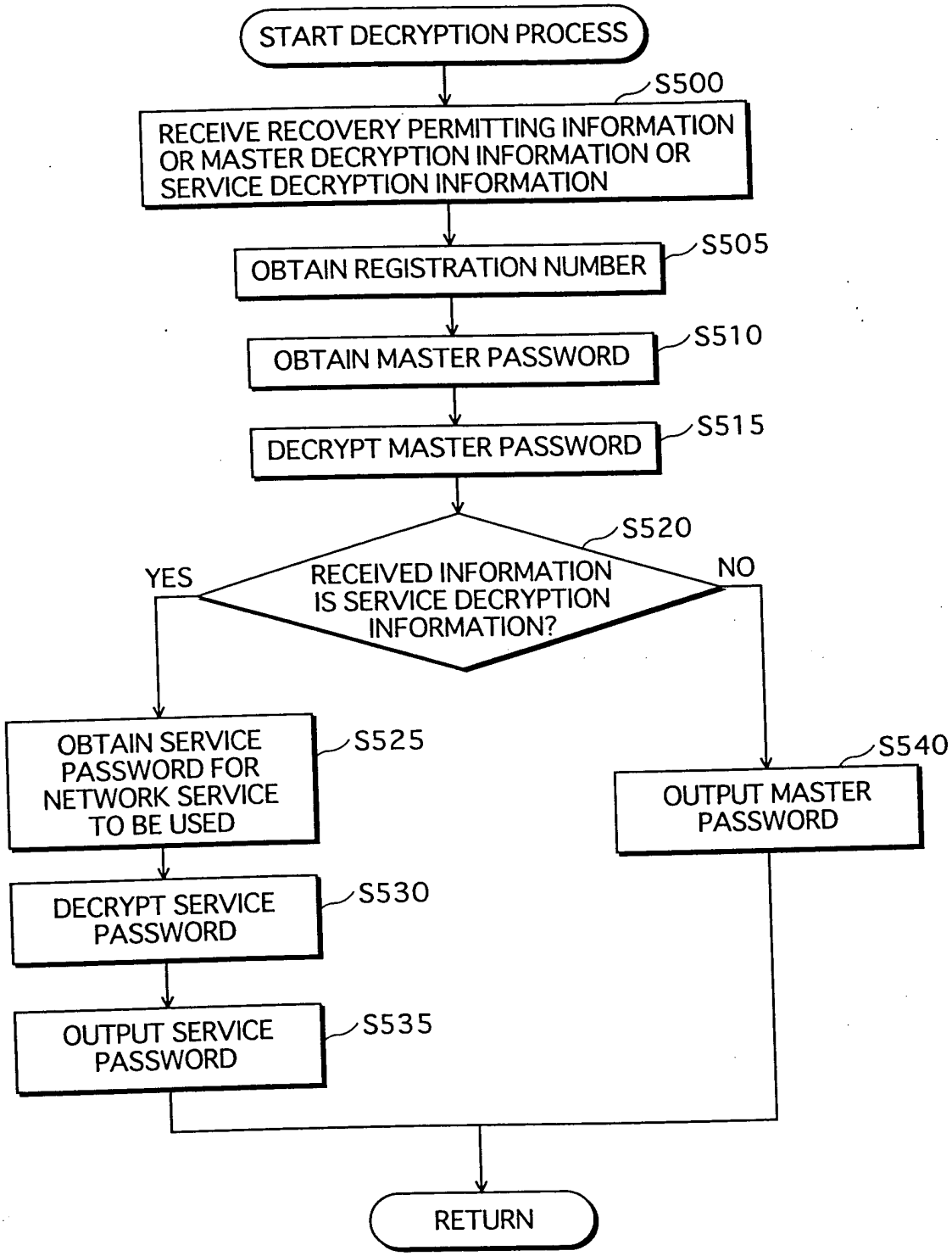

START DECRYPTION PROCESS
S500
RECEIVE RECOVERY PERMITTING INFORMATION OR MASTER DECRYPTION INFORMATION OR SERVICE DECRYPTION INFORMATION
OBTAIN REGISTRATION NUMBER
S505
OBTAIN MASTER PASSWORD
S510
DECRYPT MASTER PASSWORD
S515
S520
RECEIVED INFORMATION IS SERVICE DECRYPTION INFORMATION?
YES
NO
OBTAIN SERVICE PASSWORD FOR NETWORK SERVICE TO BE USED
S525
DECRYPT SERVICE PASSWORD
S530
OUTPUT SERVICE PASSWORD
S535
OUTPUT MASTER PASSWORD
S540
RETURN

FIG.15

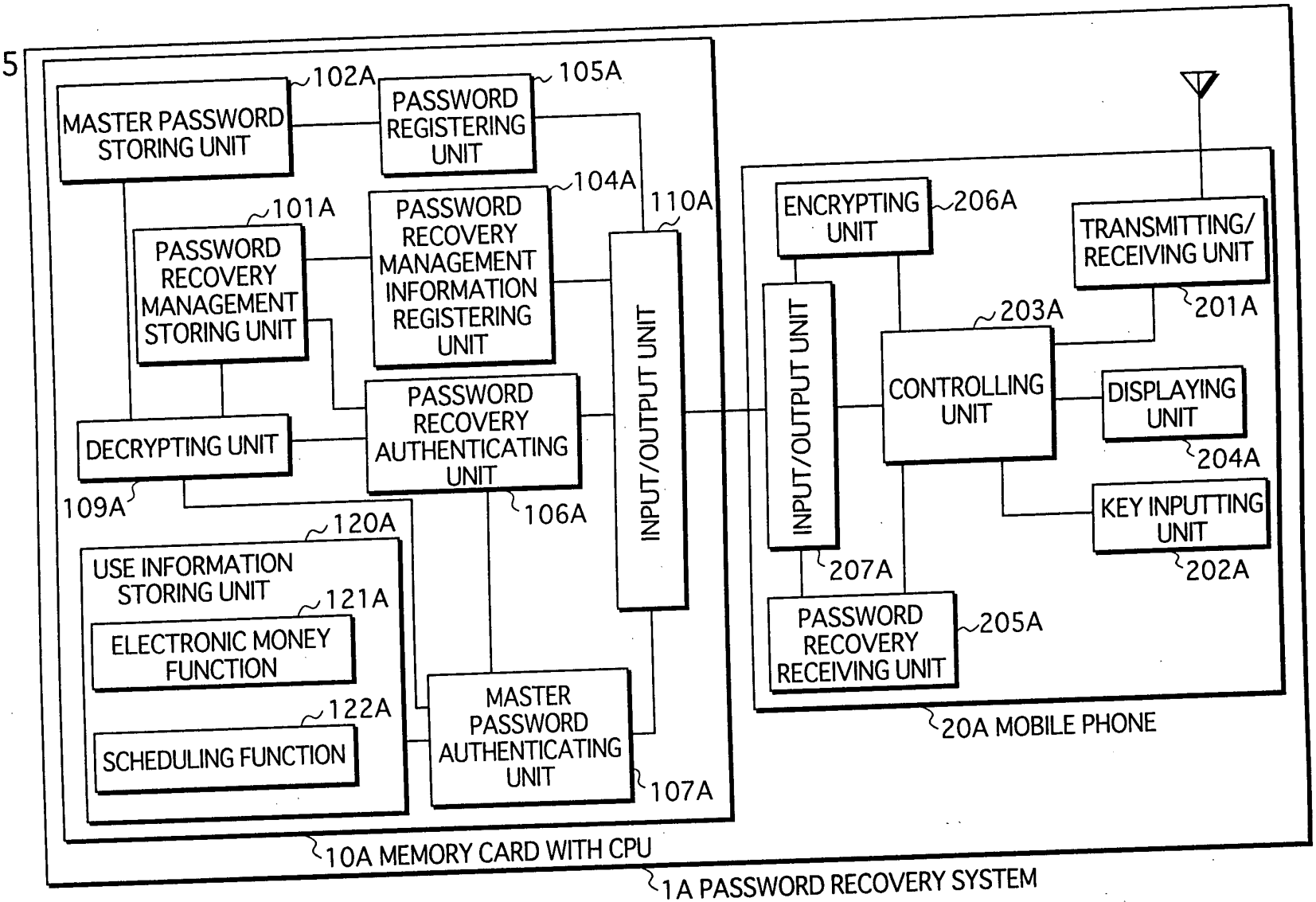

MASTER PASSWORD STORING UNIT
102A
PASSWORD REGISTERING UNIT
105A
PASSWORD RECOVERY MANAGEMENT STORING UNIT
101A
PASSWORD RECOVERY MANAGEMENT INFORMATION REGISTERING UNIT
104A
110A
DECRYPTING UNIT
109A
PASSWORD RECOVERY AUTHENTICATING UNIT
106A
INPUT/OUTPUT UNIT
USE INFORMATION STORING UNIT
120A
ELECTRONIC MONEY FUNCTION
121A
SCHEDULING FUNCTION
122A
MASTER PASSWORD AUTHENTICATING UNIT
107A
10A MEMORY CARD WITH CPU
ENCRYPTING UNIT
206A
TRANSMITTING/ RECEIVING UNIT
201A
INPUT/OUTPUT UNIT
207A
CONTROLLING UNIT
203A
DISPLAYING UNIT
204A
KEY INPUTTING UNIT
202A
PASSWORD RECOVERY RECEIVING UNIT
205A
20A MOBILE PHONE
1A PASSWORD RECOVERY SYSTEM

FIG.16

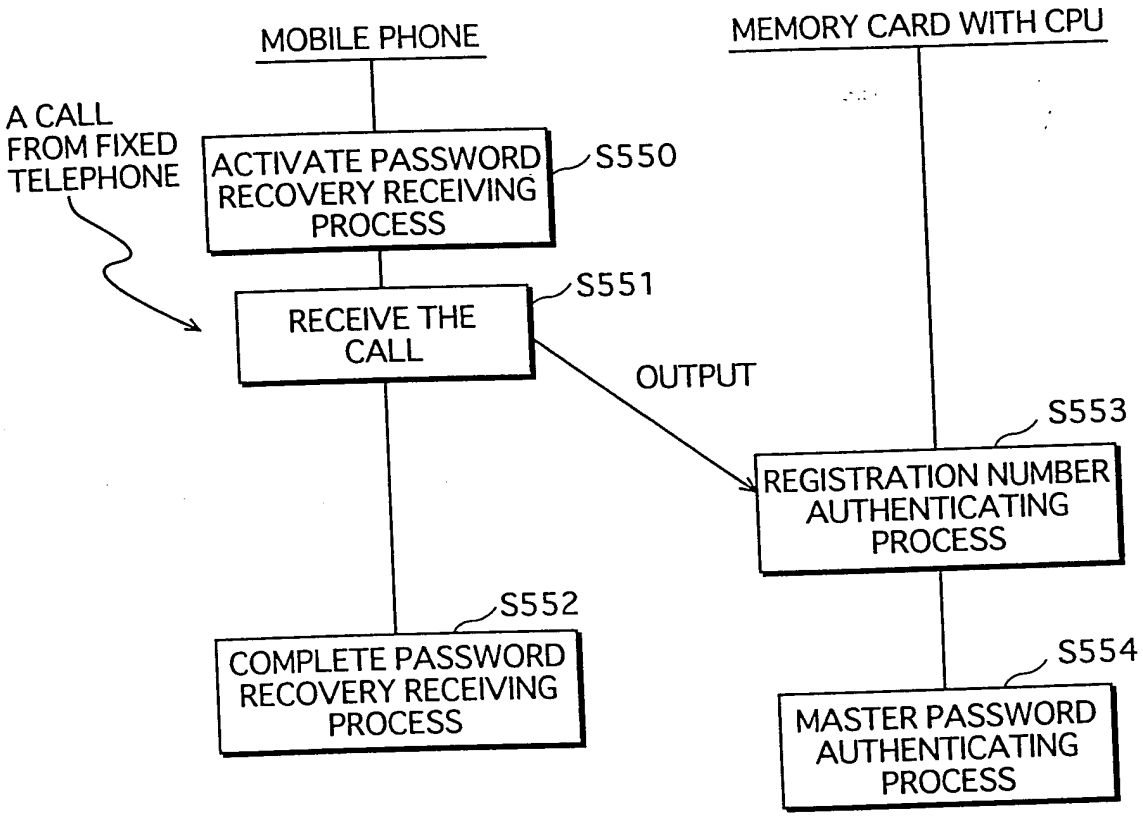

MOBILE PHONE
MEMORY CARD WITH CPU
A CALL FROM FIXED TELEPHONE
ACTIVATE PASSWORD RECOVERY RECEIVING PROCESS
S550
RECEIVE THE CALL
S551
OUTPUT
S553
REGISTRATION NUMBER AUTHENTICATING PROCESS
S552
COMPLETE PASSWORD RECOVERY RECEIVING PROCESS
S554
MASTER PASSWORD AUTHENTICATING PROCESS

FIG.17

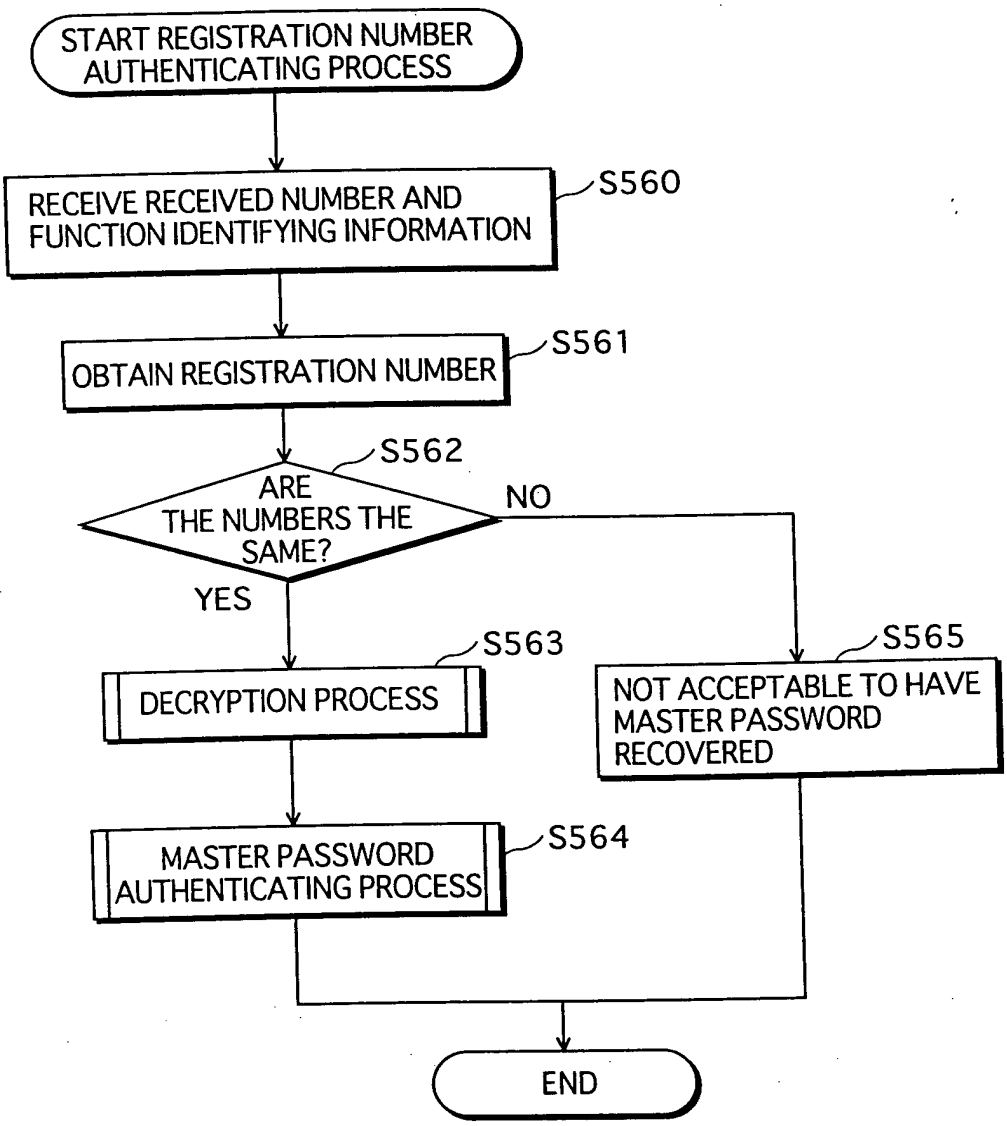

START REGISTRATION NUMBER AUTHENTICATING PROCESS
RECEIVE RECEIVED NUMBER AND FUNCTION IDENTIFYING INFORMATION
S560
OBTAIN REGISTRATION NUMBER
S561
S562
ARE THE NUMBERS THE SAME?
NO
YES
DECRYPTION PROCESS
S563
NOT ACCEPTABLE TO HAVE MASTER PASSWORD RECOVERED
S565
MASTER PASSWORD AUTHENTICATING PROCESS
S564
END

FIG.18

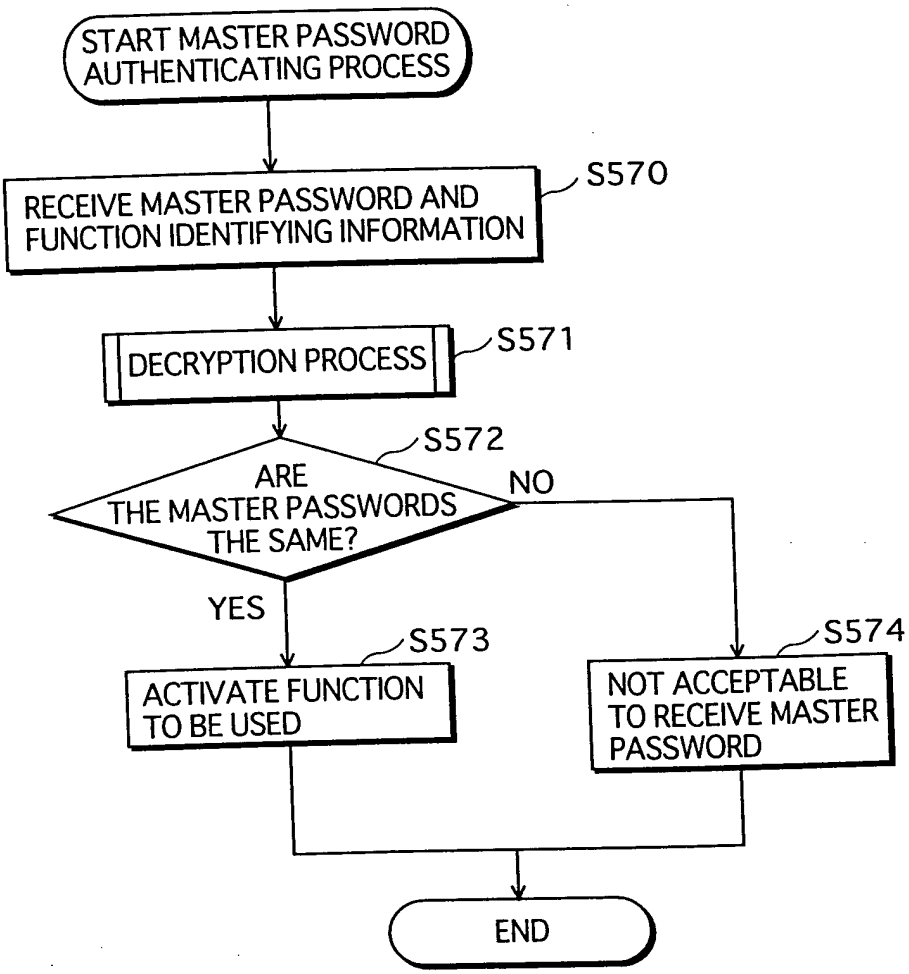

START MASTER PASSWORD AUTHENTICATING PROCESS
RECEIVE MASTER PASSWORD AND FUNCTION IDENTIFYING INFORMATION
S570
DECRYPTION PROCESS
S571
S572
ARE THE MASTER PASSWORDS THE SAME?
NO
YES
S573
ACTIVATE FUNCTION TO BE USED
S574
NOT ACCEPTABLE TO RECEIVE MASTER PASSWORD
END

FIG.19

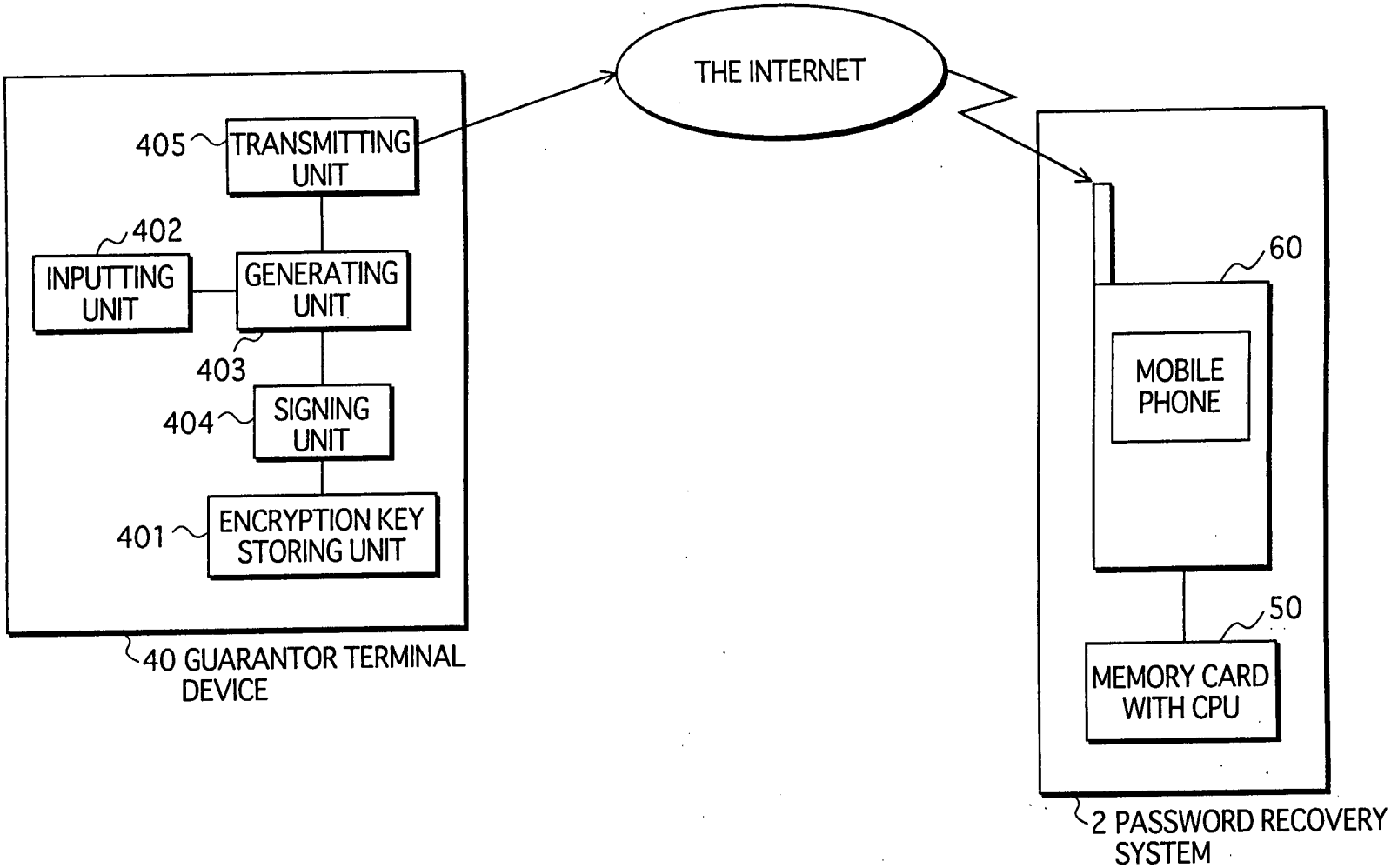

THE INTERNET
405
TRANSMITTING UNIT
402
INPUTTING UNIT
GENERATING UNIT
403
404
SIGNING UNIT
401
ENCRYPTION KEY STORING UNIT
40 GUARANTOR TERMINAL DEVICE
60
MOBILE PHONE
50
MEMORY CARD WITH CPU
2 PASSWORD RECOVERY SYSTEM

FIG.20

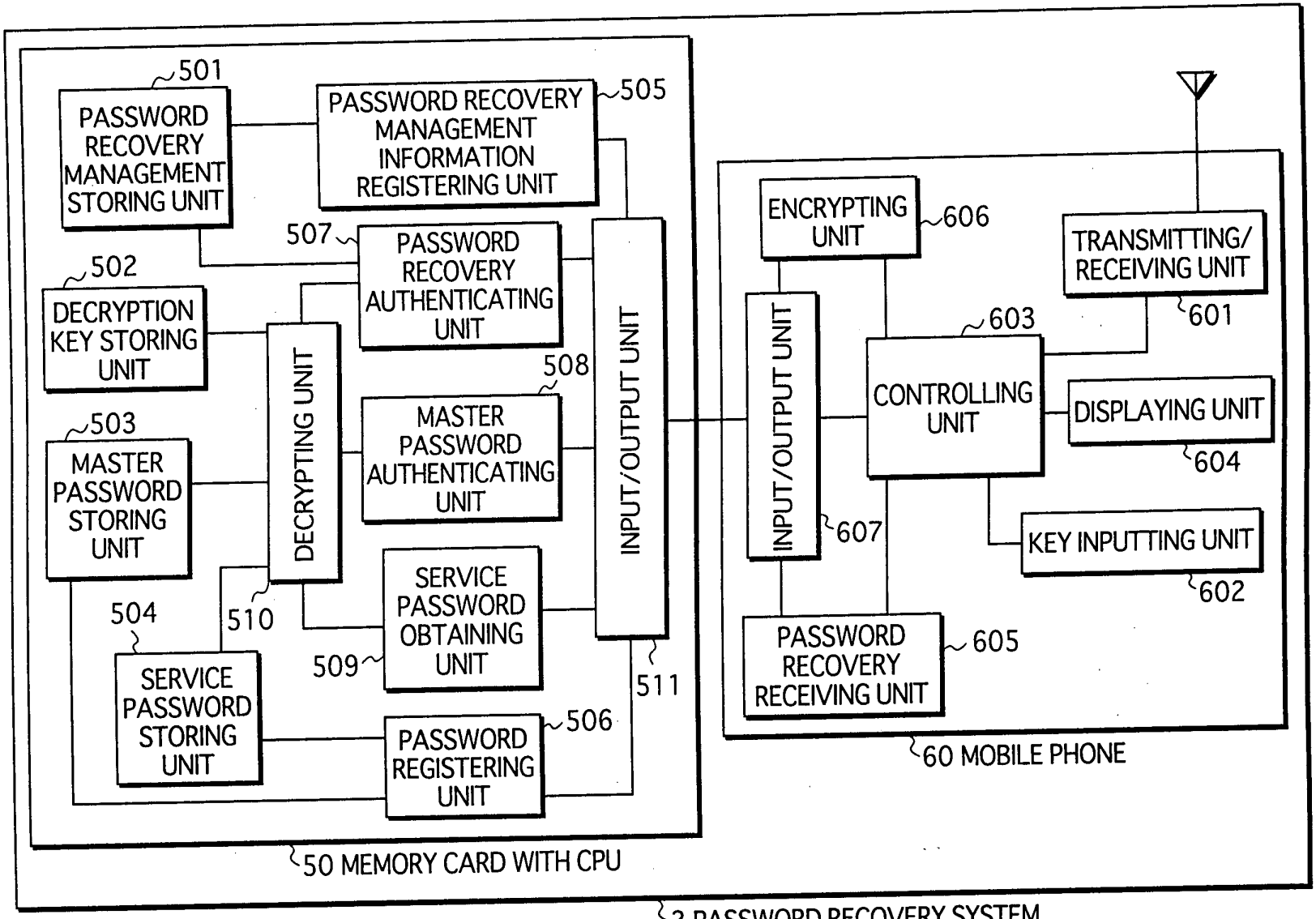

501
PASSWORD RECOVERY MANAGEMENT STORING UNIT
505
PASSWORD RECOVERY MANAGEMENT INFORMATION REGISTERING UNIT
507
PASSWORD RECOVERY AUTHENTICATING UNIT
502
DECRYPTION KEY STORING UNIT
DECRYPTING UNIT
508
MASTER PASSWORD AUTHENTICATING UNIT
503
MASTER PASSWORD STORING UNIT
INPUT/OUTPUT UNIT
504
510
SERVICE PASSWORD OBTAINING UNIT
509
SERVICE PASSWORD STORING UNIT
511
506
PASSWORD REGISTERING UNIT
50 MEMORY CARD WITH CPU
ENCRYPTING UNIT
606
TRANSMITTING/ RECEIVING UNIT
601
603
INPUT/OUTPUT UNIT
CONTROLLING UNIT
DISPLAYING UNIT
604
607
KEY INPUTTING UNIT
602
PASSWORD RECOVERY RECEIVING UNIT
605
60 MOBILE PHONE
2 PASSWORD RECOVERY SYSTEM

FIG.21

700 RECOVERY MANAGEMENT INFORMATION TABLE

GUARANTOR NAMES	PUBLIC KEY CERTIFICATES
GUARANTOR NAME A	PUBLIC KEY CERTIFICATE A
GUARANTOR NAME B	PUBLIC KEY CERTIFICATE B
⋮	⋮

FIG.22

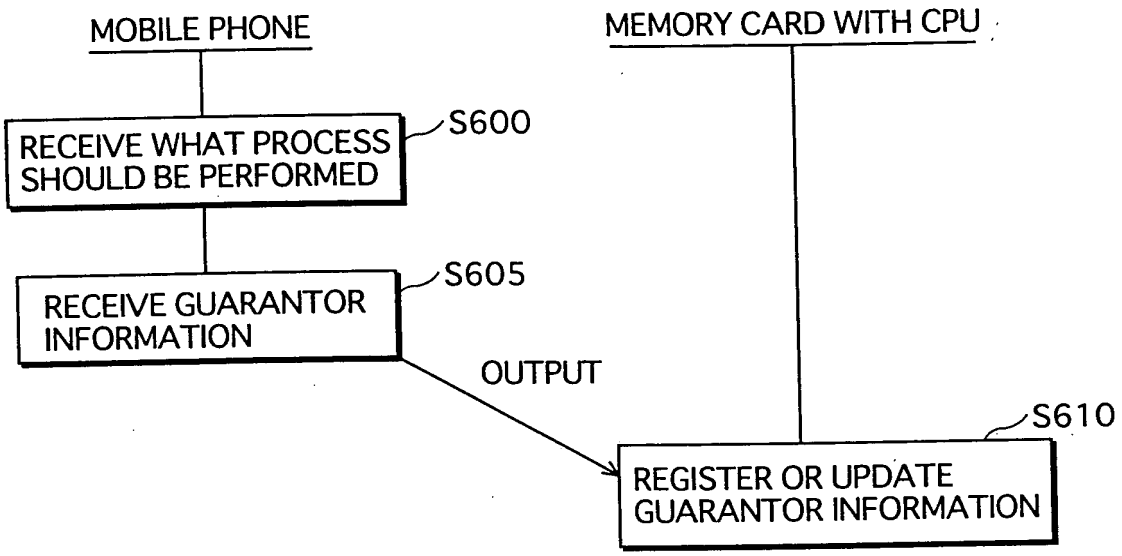

MOBILE PHONE
MEMORY CARD WITH CPU
RECEIVE WHAT PROCESS SHOULD BE PERFORMED
S600
RECEIVE GUARANTOR INFORMATION
S605
OUTPUT
S610
REGISTER OR UPDATE GUARANTOR INFORMATION

FIG.23

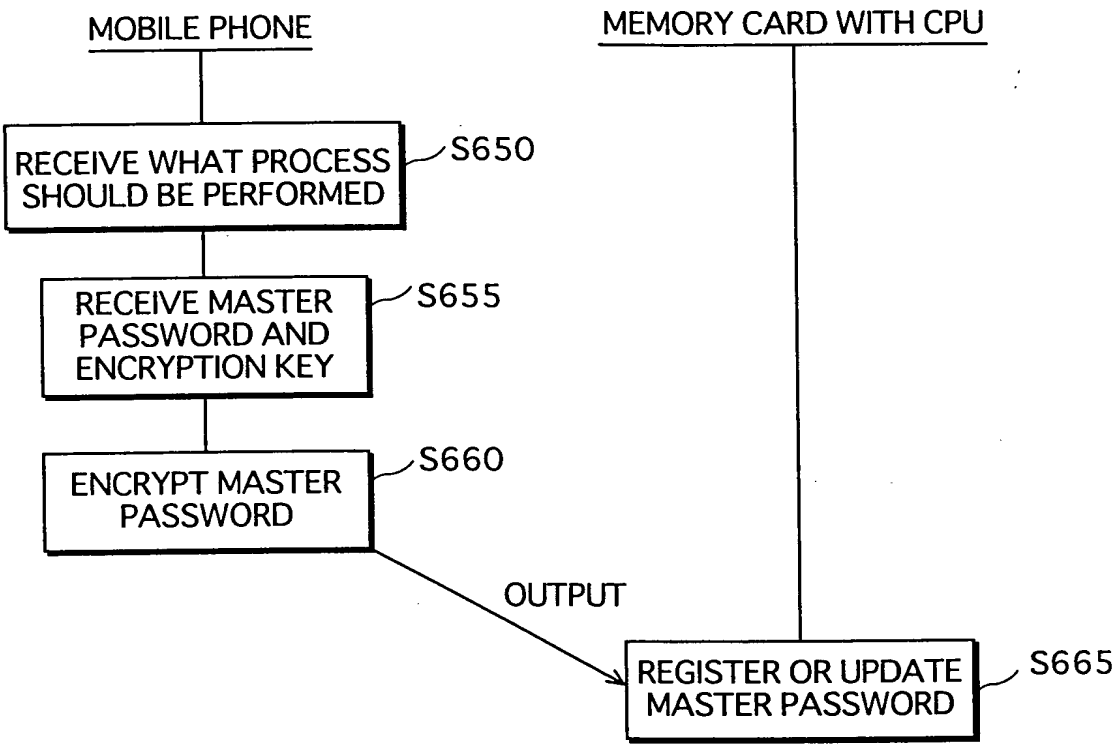

MOBILE PHONE
MEMORY CARD WITH CPU
RECEIVE WHAT PROCESS SHOULD BE PERFORMED
S650
RECEIVE MASTER PASSWORD AND ENCRYPTION KEY
S655
ENCRYPT MASTER PASSWORD
S660
OUTPUT
REGISTER OR UPDATE MASTER PASSWORD
S665

FIG.24

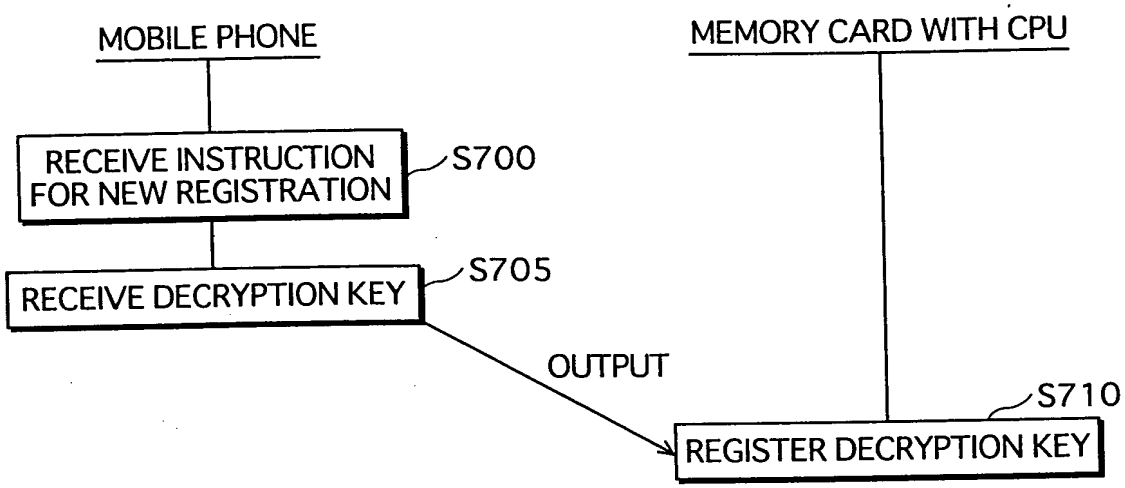

MOBILE PHONE
MEMORY CARD WITH CPU
RECEIVE INSTRUCTION FOR NEW REGISTRATION
S700
RECEIVE DECRYPTION KEY
S705
OUTPUT
S710
REGISTER DECRYPTION KEY

FIG.25

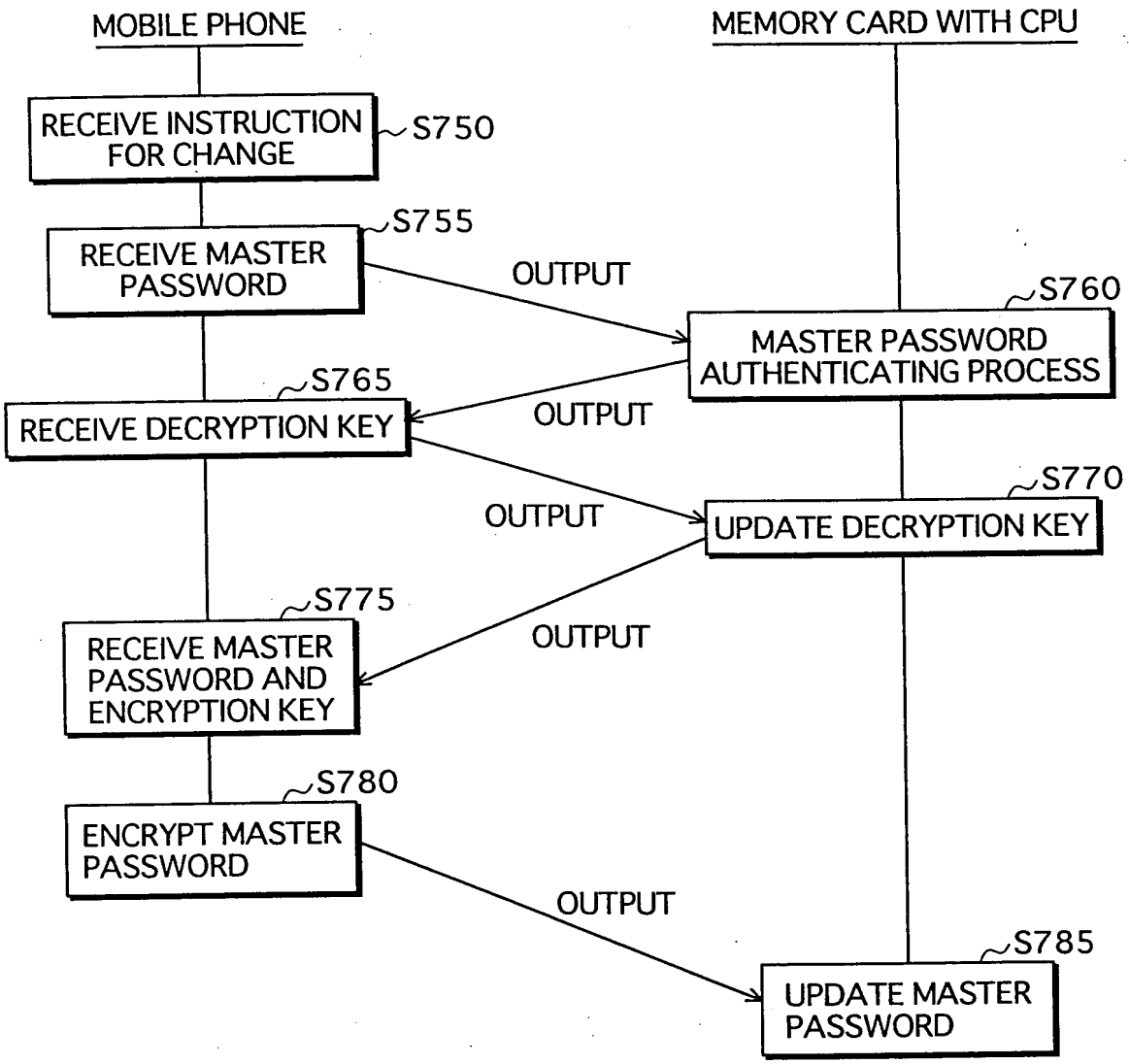

MOBILE PHONE
MEMORY CARD WITH CPU
RECEIVE INSTRUCTION FOR CHANGE
S750
RECEIVE MASTER PASSWORD
S755
OUTPUT
MASTER PASSWORD AUTHENTICATING PROCESS
S760
RECEIVE DECRYPTION KEY
S765
OUTPUT
OUTPUT
UPDATE DECRYPTION KEY
S770
RECEIVE MASTER PASSWORD AND ENCRYPTION KEY
S775
OUTPUT
ENCRYPT MASTER PASSWORD
S780
OUTPUT
UPDATE MASTER PASSWORD
S785

FIG.26

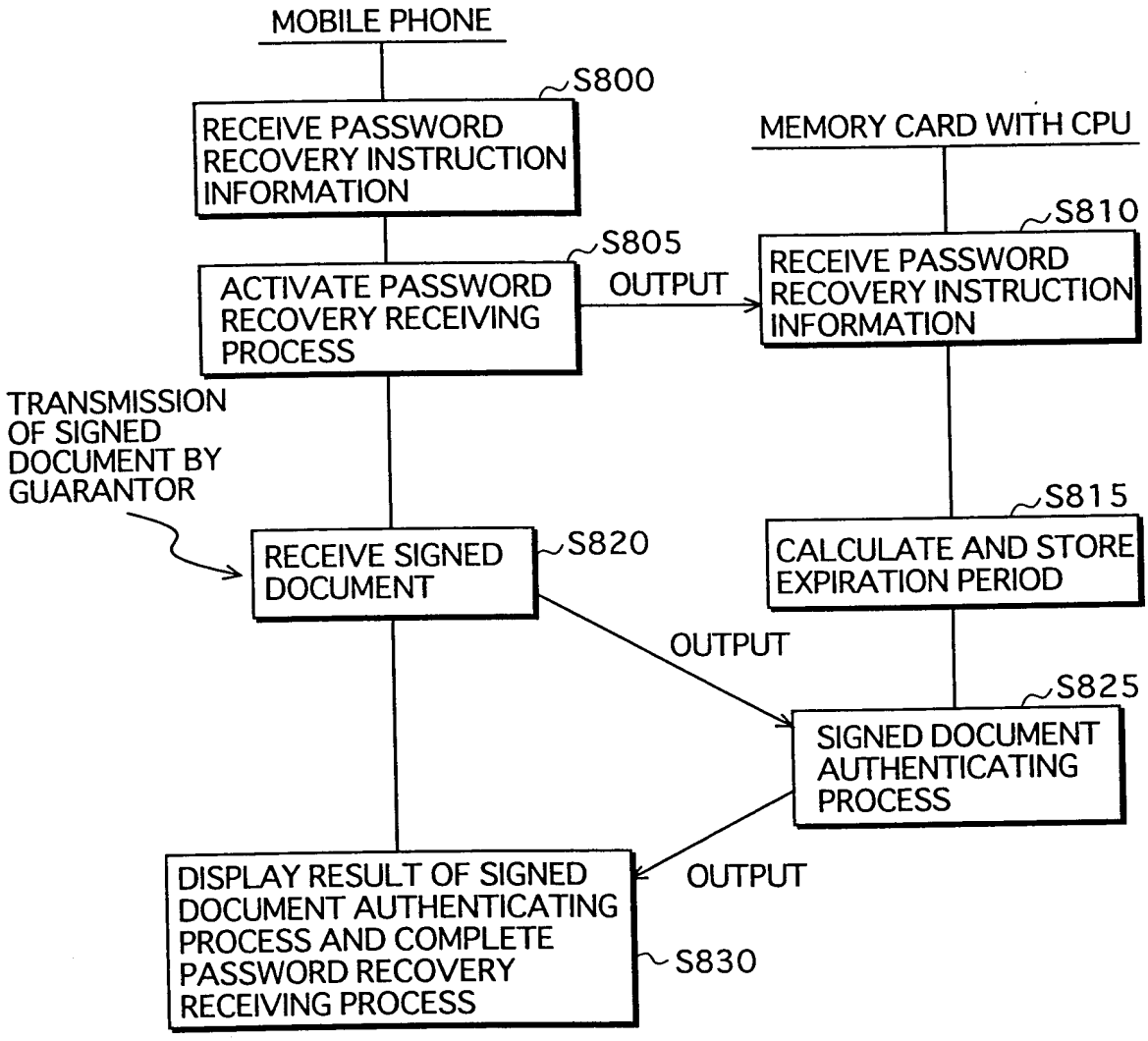

MOBILE PHONE
S800
RECEIVE PASSWORD RECOVERY INSTRUCTION INFORMATION
MEMORY CARD WITH CPU
S810
S805
ACTIVATE PASSWORD RECOVERY RECEIVING PROCESS
OUTPUT
RECEIVE PASSWORD RECOVERY INSTRUCTION INFORMATION
TRANSMISSION OF SIGNED DOCUMENT BY GUARANTOR
S815
RECEIVE SIGNED DOCUMENT
S820
CALCULATE AND STORE EXPIRATION PERIOD
OUTPUT
S825
SIGNED DOCUMENT AUTHENTICATING PROCESS
DISPLAY RESULT OF SIGNED DOCUMENT AUTHENTICATING PROCESS AND COMPLETE PASSWORD RECOVERY RECEIVING PROCESS
OUTPUT
S830

FIG.27

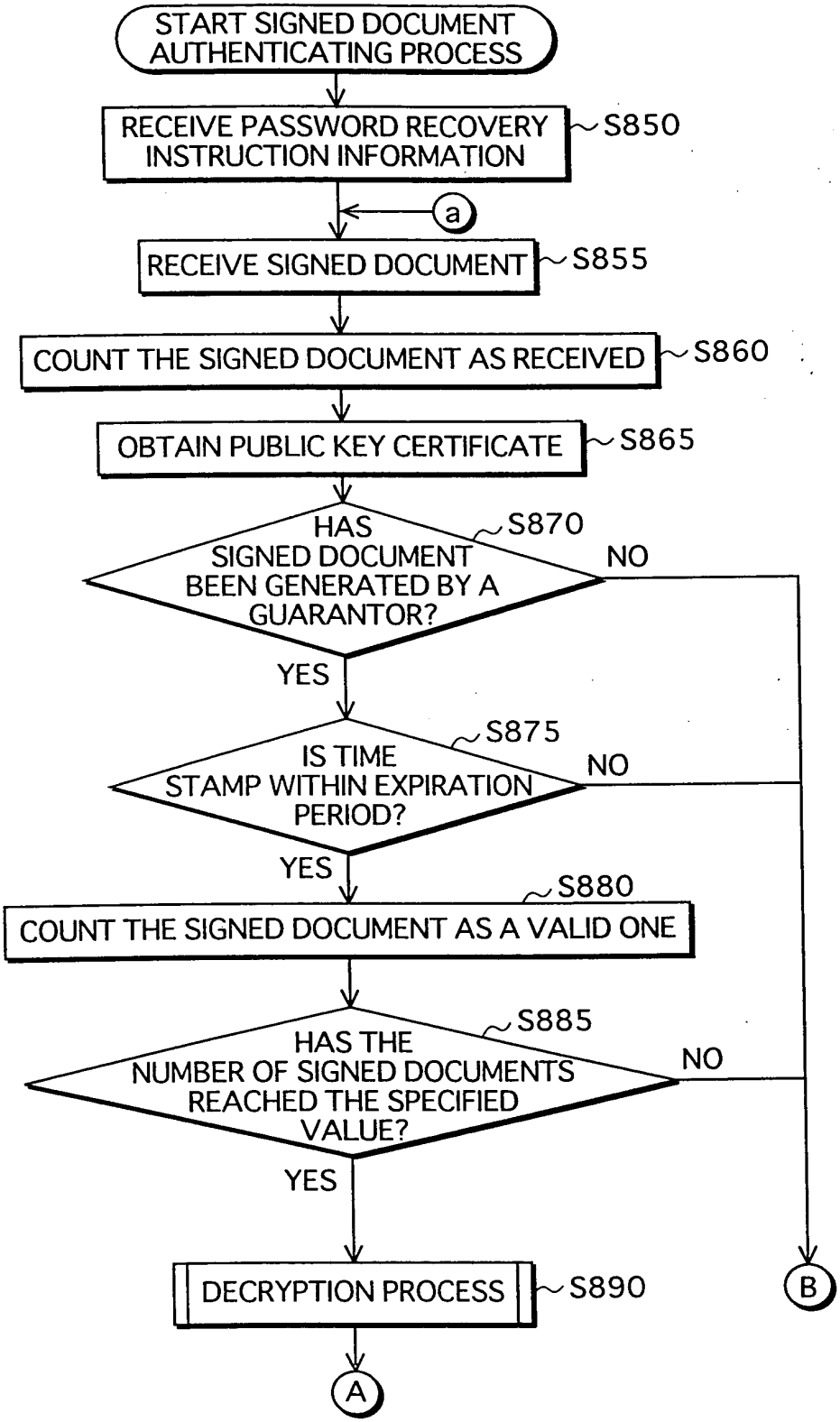

START SIGNED DOCUMENT AUTHENTICATING PROCESS
RECEIVE PASSWORD RECOVERY INSTRUCTION INFORMATION
S850
a
RECEIVE SIGNED DOCUMENT
S855
COUNT THE SIGNED DOCUMENT AS RECEIVED
S860
OBTAIN PUBLIC KEY CERTIFICATE
S865
HAS SIGNED DOCUMENT BEEN GENERATED BY A GUARANTOR?
S870
NO
YES
IS TIME STAMP WITHIN EXPIRATION PERIOD?
S875
NO
YES
COUNT THE SIGNED DOCUMENT AS A VALID ONE
S880
HAS THE NUMBER OF SIGNED DOCUMENTS REACHED THE SPECIFIED VALUE?
S885
NO
YES
DECRYPTION PROCESS
S890
B
A

FIG.28

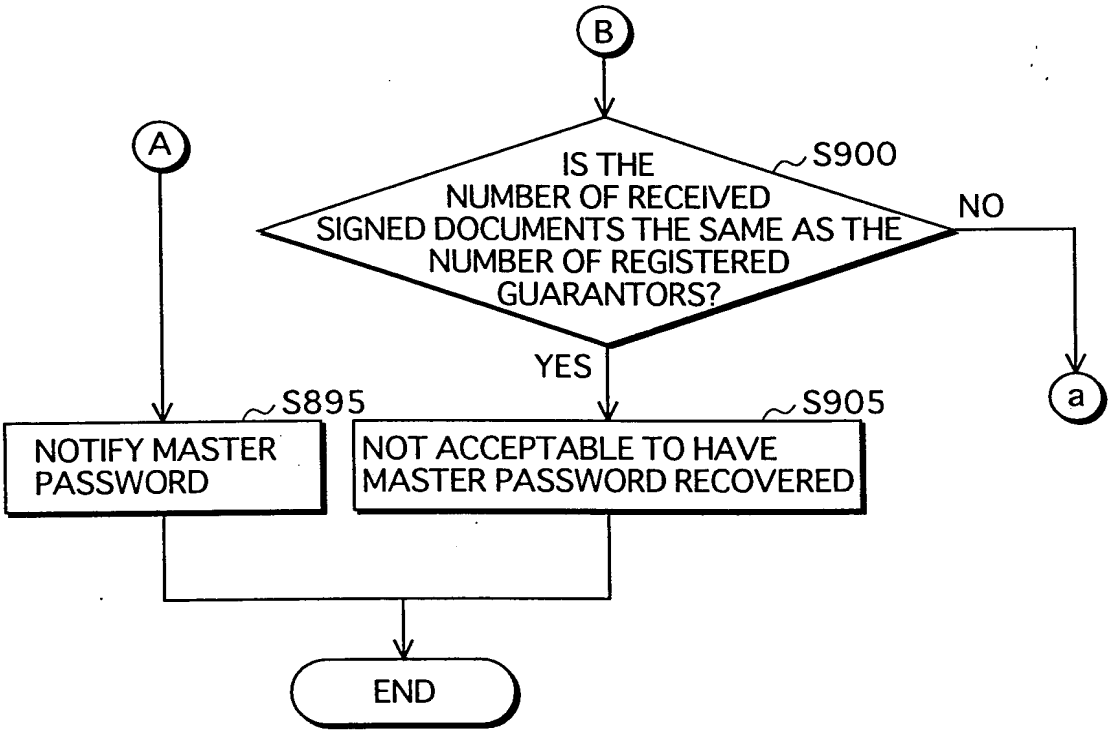

B
A
IS THE NUMBER OF RECEIVED SIGNED DOCUMENTS THE SAME AS THE NUMBER OF REGISTERED GUARANTORS?
S900
NO
YES
a
S895
NOTIFY MASTER PASSWORD
S905
NOT ACCEPTABLE TO HAVE MASTER PASSWORD RECOVERED
END

FIG.29

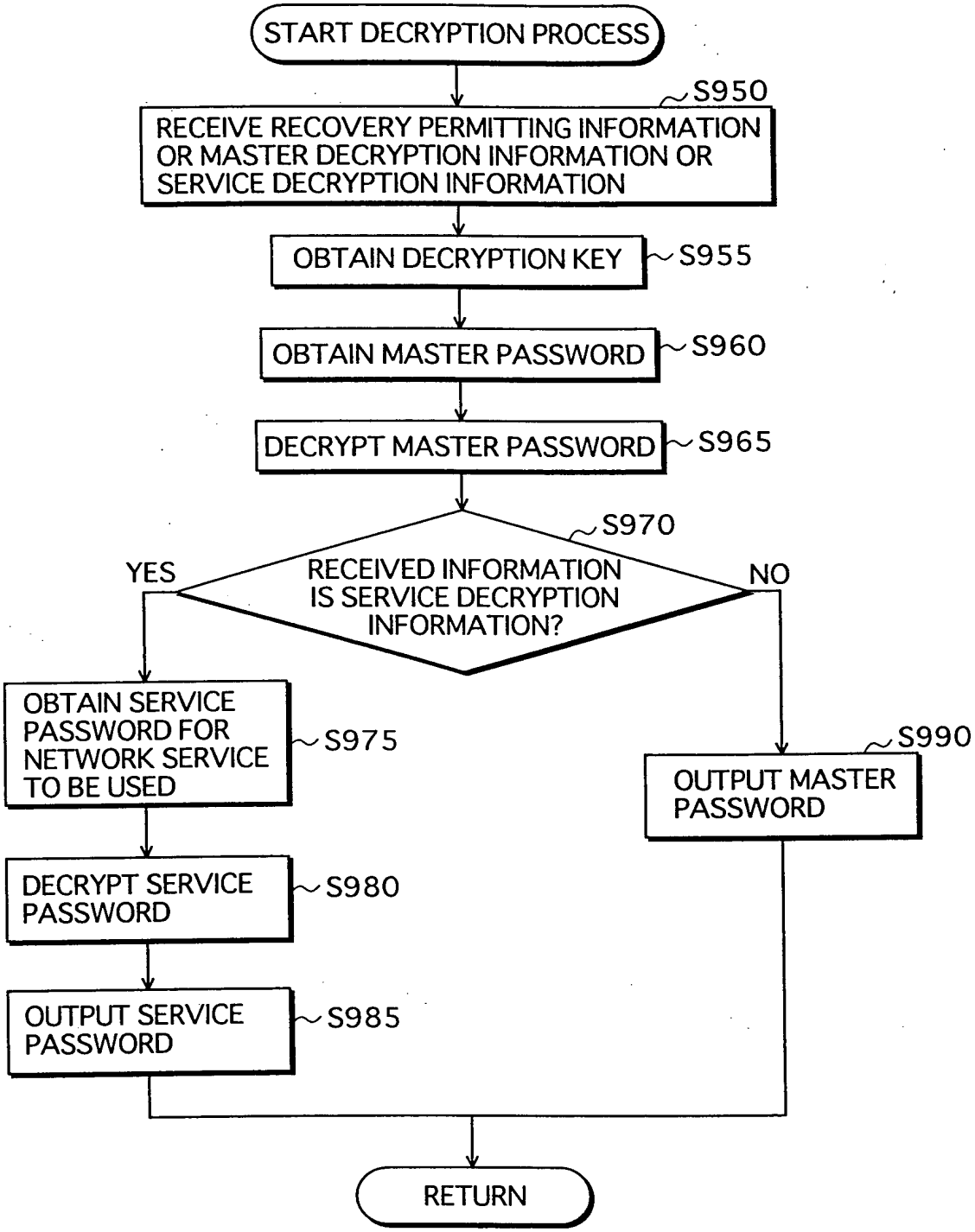

START DECRYPTION PROCESS
S950
RECEIVE RECOVERY PERMITTING INFORMATION OR MASTER DECRYPTION INFORMATION OR SERVICE DECRYPTION INFORMATION
OBTAIN DECRYPTION KEY
S955
OBTAIN MASTER PASSWORD
S960
DECRYPT MASTER PASSWORD
S965
S970
RECEIVED INFORMATION IS SERVICE DECRYPTION INFORMATION?
YES
NO
OBTAIN SERVICE PASSWORD FOR NETWORK SERVICE TO BE USED
S975
DECRYPT SERVICE PASSWORD
S980
OUTPUT SERVICE PASSWORD
S985
OUTPUT MASTER PASSWORD
S990
RETURN

FIG.30

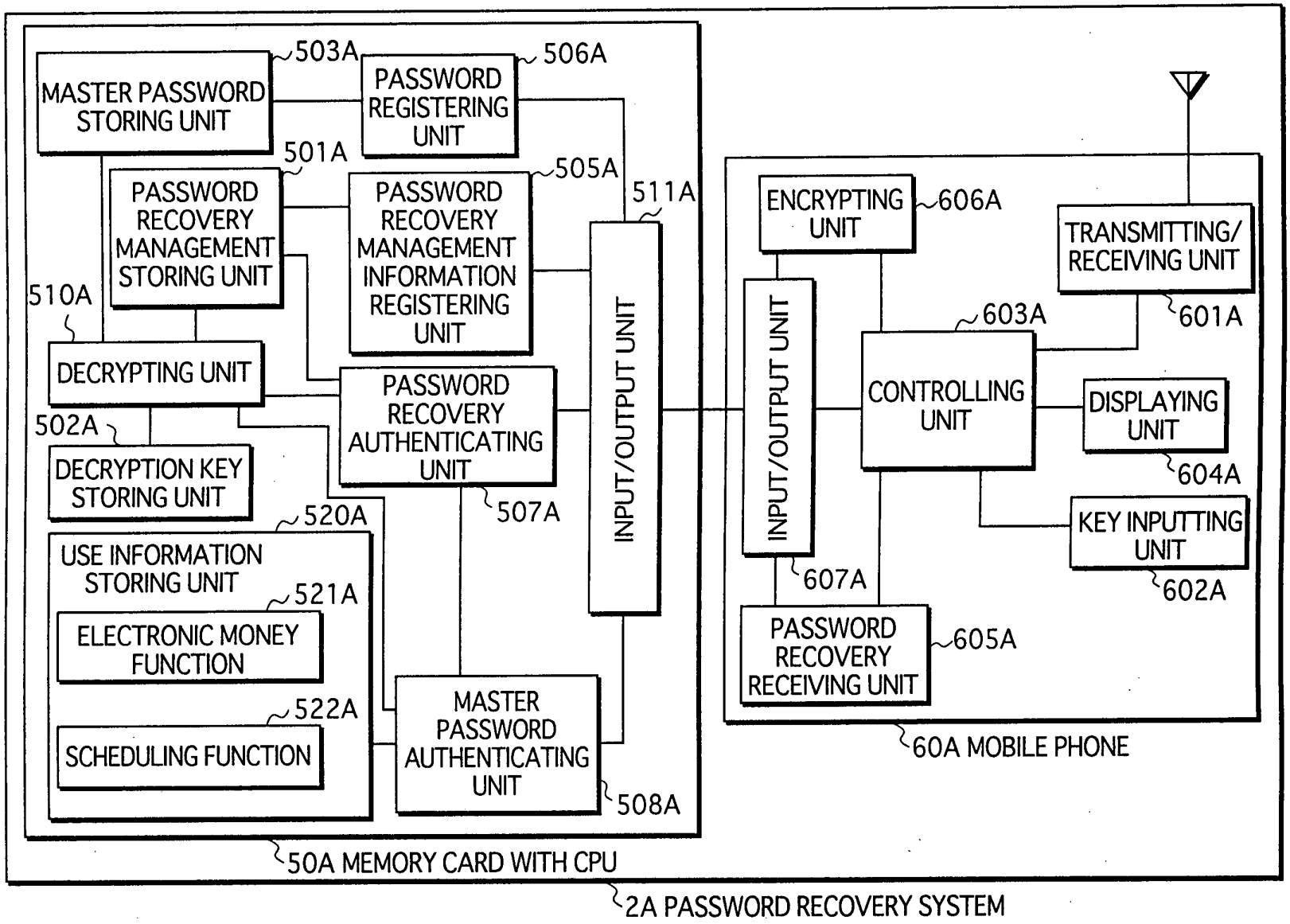

MASTER PASSWORD STORING UNIT
503A
PASSWORD REGISTERING UNIT
506A
501A
PASSWORD RECOVERY MANAGEMENT STORING UNIT
505A
PASSWORD RECOVERY MANAGEMENT INFORMATION REGISTERING UNIT
511A
510A
DECRYPTING UNIT
PASSWORD RECOVERY AUTHENTICATING UNIT
502A
DECRYPTION KEY STORING UNIT
507A
520A
USE INFORMATION STORING UNIT
521A
ELECTRONIC MONEY FUNCTION
522A
SCHEDULING FUNCTION
MASTER PASSWORD AUTHENTICATING UNIT
508A
INPUT/OUTPUT UNIT
50A MEMORY CARD WITH CPU
ENCRYPTING UNIT
606A
TRANSMITTING/ RECEIVING UNIT
601A
603A
INPUT/OUTPUT UNIT
CONTROLLING UNIT
DISPLAYING UNIT
604A
KEY INPUTTING UNIT
602A
607A
PASSWORD RECOVERY RECEIVING UNIT
605A
60A MOBILE PHONE
2A PASSWORD RECOVERY SYSTEM

FIG.31

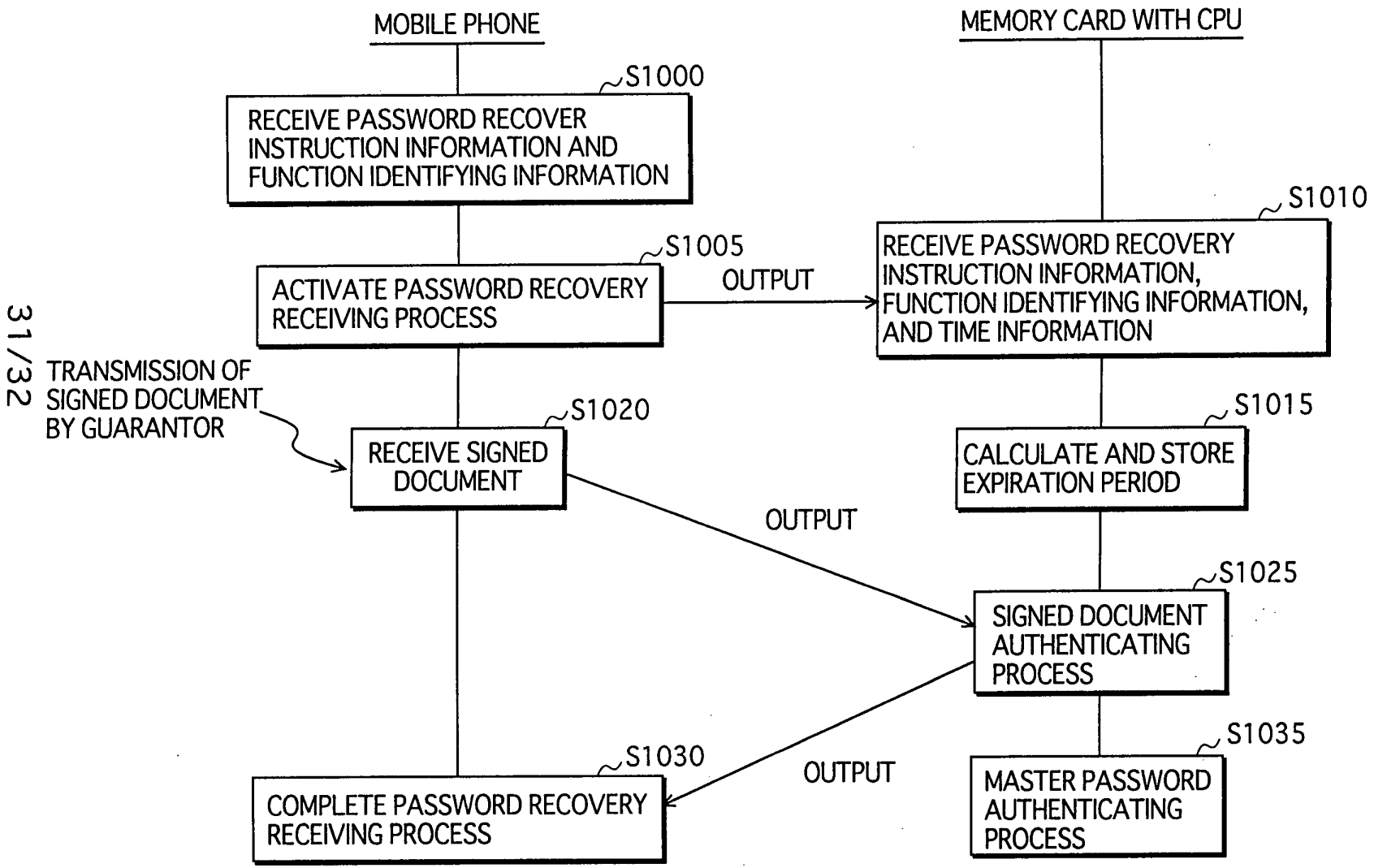
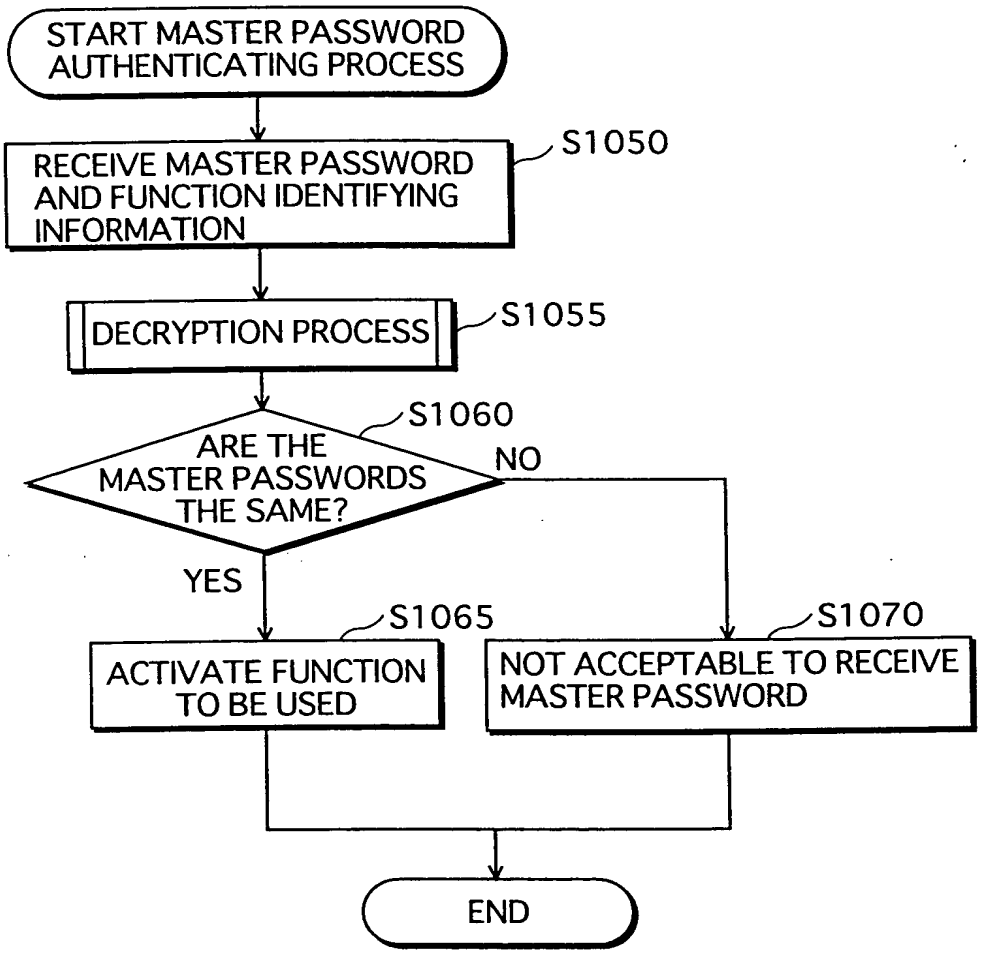

MOBILE PHONE
MEMORY CARD WITH CPU
S1000
RECEIVE PASSWORD RECOVER INSTRUCTION INFORMATION AND FUNCTION IDENTIFYING INFORMATION
S1010
S1005
ACTIVATE PASSWORD RECOVERY RECEIVING PROCESS
OUTPUT
RECEIVE PASSWORD RECOVERY INSTRUCTION INFORMATION, FUNCTION IDENTIFYING INFORMATION, AND TIME INFORMATION
TRANSMISSION OF SIGNED DOCUMENT BY GUARANTOR
S1020
S1015
RECEIVE SIGNED DOCUMENT
CALCULATE AND STORE EXPIRATION PERIOD
OUTPUT
S1025
SIGNED DOCUMENT AUTHENTICATING PROCESS
S1035
S1030
OUTPUT
COMPLETE PASSWORD RECOVERY RECEIVING PROCESS
MASTER PASSWORD AUTHENTICATING PROCESS

FIG.32


START MASTER PASSWORD AUTHENTICATING PROCESS
RECEIVE MASTER PASSWORD AND FUNCTION IDENTIFYING INFORMATION
S1050
DECRYPTION PROCESS
S1055
ARE THE MASTER PASSWORDS THE SAME?
S1060
NO
YES
ACTIVATE FUNCTION TO BE USED
S1065
NOT ACCEPTABLE TO RECEIVE MASTER PASSWORD
S1070
END